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Growing red clover





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**Growing Red Clover**  
*by E. C. Blair*

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# Growing Red Clover

By E. C. BLAIR, Extension Agronomist

Red clover has long been an important crop in Central and Western North Carolina. It ranks among the first as a good crop for hay, for soil improvement, and for use as a cover crop. It has the added advantages of requiring very little labor in sowing; and of remaining on the land two years instead of one, yielding good returns both years. Its disadvantages are that it is rather particular in its soil requirements, that the seed must be sown in just the right way, to secure a good stand, and that weeds greatly damage the crop under certain conditions.

On fertile soil, well limed, one and one-half to two tons of hay per acre may usually be expected at each cutting. The hay is fine in texture and quality, so that livestock will eat the whole of it. It ranks high in food value, containing 12.3 percent protein, 31.1 percent carbohydrates, and 3.3 percent fat.

Since red clover is grown for soil improvement, it is of interest to know that each ton of the dry hay contains 41.8 pounds of nitrogen, 8.6 pounds of phosphoric acid, and 41.6 pounds of potash. If the soil is properly inoculated most of the nitrogen in the hay will have come from the air. When turned under, each ton of hay will add 41.8 pounds of nitrogen to the soil, or the equivalent of 278 pounds of nitrate of soda. The phosphoric acid and potash in the plant were taken from the soil, but are returned in a form readily available for future crops. In addition to this, the soil receives a large amount of organic matter.

Leaving out the question of plant food, organic matter is of prime importance for its mechanical effect on the soil. By making it more porous, organic matter helps to prevent soil washing, as more water can sink into the soil. This is of untold benefit to crops in dry weather. Organic matter helps to prevent heavy soils from running together and baking and permits them to be more easily worked. Organic matter is also constantly being burned up by the action of sunlight on the soil.

Most North Carolina soils, when first cleared, have a good supply of organic matter, but because of the cropping systems followed in which too much attention is paid to immediate returns, and not enough to keeping plenty of this substance in the soil, the supply grows less each year. Some farmers make an effort to revive depleted soils by using larger amounts of commercial fertilizer, but with poor results. A system of rotation that includes crops for turning into the



land, and the use of fertilizers judiciously in connection with the rotation must be followed if the soils are to be improved, or even maintained in their present state of productiveness.

### HOW THE CROP GROWS

Red clover is a biennial legume, and one of the true clovers. The seed may be sown either in the fall or spring. Each plant makes an abundance of fine, erect stems, coming out from the crown of the plant, at the ground. The stems grow from one to two feet high, or even higher. The plant produces considerable foliage. The leaves consist of three leaflets, dark green in color, with an irregular spot of lighter green in the center of each. The flowers are pink, and are borne in heads at the ends of the stems. The roots penetrate deeply into the soil.

There are two varieties: The **medium red**, and the **mammoth** or **sapling**. The two are similar in general appearance, the main difference being that the mammoth is larger, and later in maturity. It will thrive on poorer soil than will the medium red. Owing to its lateness, it makes a poor second crop.

Red clover remains on the land through two summers, on rich soil it yields a good crop of hay late in the first summer. This is especially true of clover sown in the fall. On ordinary land the growth is small the first year, and there is not much to cut but weeds. However, they should be removed; because they take moisture needed by the young clover plants, and in order to have a clean crop of hay the second year. During the second year red clover makes two crops. The first matures about June 1st. This is the main hay crop. The second crop ripens about August 1st, and makes about the same amount of growth as the first crop. It is objectionable for hay, in that it causes salivation of livestock. This is fortunate, for the second crop is therefore usually turned under for soil improvement, instead of being taken off. It should always be borne in mind that when the first and second crops are both removed, there will be no improvement of the soil. A crop must be plowed in if the supply of nitrogen and organic matter in the soil is to be increased. The second crop is also the principal source of seed, and is a good honey crop. Where a large acreage is to be sown for hay, it is well to sow part of it to mammoth clover, so as to lengthen the haying season. If seed are saved at home, only one variety should be grown on the farm; otherwise the seed of the two will become mixed.

Being a legume, red clover can feed on nitrogen from the air if inoculated with the proper bacteria. In many sections of North Carolina, clover has been grown so extensively that these bacteria are always present in the soil. Where there is any doubt of their pres-

ence, the bacteria should be supplied. This may be done by means of commercial cultures, or by using soil from a field known to be inoculated. The same bacteria that inoculates red clover will inoculate crimson, alsike, or white clovers.

### SOILS

Red clover does best on a fairly heavy soil, and is grown most extensively on the red clays and clay loams of our Piedmont Section. However, good results are frequently obtained on sandy loam soils. The soil should be of moderate fertility, or better. Very poor, worn out soil should be improved by means of soy beans, cowpeas or rye before being sown to red clover. In general, land should be rich enough to produce 20 to 25 bushels of corn per acre if red clover is to succeed on it.

### ACID SOILS

Many fields have made good crops of clover a few times; then each succeeding crop has become poorer until finally there is a complete crop failure. This is usually because the repeated growing of clover has exhausted the lime supply of the soil. Red clover will tolerate less soil acidity than most of our crops. The turning under of the second crop of clover adds organic acids to the soil; which are neutralized by lime in the soil until that lime is exhausted. Clover also feeds more heavily on lime than most crops, which hastens the exhaustion of the lime.

### THE NEED OF LIME

The length of time that red clover can be grown on a given field without liming depends on several factors. The amount of lime naturally present in the soil has most to do with it. Some types of soil, such as the black jack (Iredell) and deep red clay (Mecklenburg and Davidson) soils of the Piedmont section, carry a rather high content of lime, which makes them specially adapted to red clover. Experience has shown however, that in course of time the lime supply of even these soils becomes exhausted and the clover fails. Some farmers use liberal amounts of basic slag, which contains forty per cent quick lime, as a source of phosphoric acid. The lime in this material helps greatly in growing clover. Recently other phosphatic fertilizers containing lime have been put on the market. They, as well as basic slag, seem to give good results in neutralizing soil acids; but at present prices more phosphoric acid and more lime may be obtained for a given amount of money by buying 16 percent acid phosphate and ground limestone. The results are usually better because more lime will be applied to each acre when limestone is used. Stable manure is often helpful in getting a stand of clover where lime is not used. A rich soil will make



a better crop of clover without lime than one of moderate fertility. The same soil, limed, will make a much larger crop. As we grow clover partly for soil improvement, it is better to lime ordinary land and grow clover there than to grow it on rich land without lime.

If a good application of ground limestone at the rate of one or two tons per acre is made where clover has failed, the next crop is usually much better than the field has ever produced before. The value of lime has been proven hundreds of times by liming part of a field and leaving the other part unlimed, then sowing clover. Figures 1 and 2 show results obtained at the Piedmont Branch Station Farm near Statesville, N. C., in a test of this kind.

In general, a good application of lime will double the yield of red clover. Not only will it grow ranker, but the stand will be better because the crop will have sufficient vigor to keep the weeds choked out. It is best to apply the lime six months to one year before sowing the seed, as it then has plenty of time to neutralize acids in the soil. If clover is to be sown on small grain in the spring, lime may be applied the preceding fall while preparing the ground for the grain; or it may be put on while getting ready for corn, or whatever crop precedes the small grain.

In the long run it will be necessary to lime any soil where red clover is regularly grown. The lime should be applied at least once in each rotation. The initial application should usually be one to two tons of ground limestone per acre. Follow this with one ton every three years, or 1 1-2 tons or more every five years. A definite place should be had in the rotation for applying the limestone. As before stated, the best time for this is from six months to a year before sowing the clover seed. The cost of liming should not be charged entirely to the clover crop, for the lime will directly benefit any other legumes grown in the rotation. On limed land the second crop of clover will be larger, and this should be turned under for soil improvement. In this way the lime will indirectly benefit all crops grown.

### HOW TO FERTILIZE

It should not be understood from the above that lime can take the place of fertilizers, for clover or any other crop. We must still supply the important plant foods, nitrogen, phosphoric acid and potash.

Although red clover is a legume, it needs nitrogen supplied either by stable manure or commercial fertilizer, when sown on poor soils. This will give it some nitrogen to feed upon while the roots are becoming established, and before it can take nitrogen from the air. Many a stand of clover has been starved out through lack of nitrogen during this period. Fertile soils contain enough nitrogen to start the clover off, and none need be applied to them.





FIG. 1. Where red clover was sown without liming. Note almost total failure. Iredell Test Farm, Statesville, N. C., 1920.



FIG. 2. Red clover on same field as Fig. 1, but with two tons limestone per acre. Iredell Test Farm. Statesville, N. C., 1920.



The soils of Western North Carolina are nearly all deficient in phosphoric acid. It is well known that this plant food must be supplied if crop yields are to be satisfactory. This is especially true of red clover, which when inoculated can use nitrogen from the air, but not unless it has phosphoric acid to go with the nitrogen. Therefore, red clover should be well supplied with phosphoric acid.

Clover feeds heavily on potash. One ton of red clover hay contains more potash than a ton of 8-2-2 fertilizer. Because most soils in Western North Carolina show a high content of potash, little or none is used for clover. However, it often happens that while there is plenty of potash in the soil, not enough is available at one time to supply a heavy feeder like red clover.

When muriate of potash is selling around \$50 per ton it would generally pay to use 40 to 50 pounds per acre. This would cost \$1.00 to \$1.25. In place of 50 pounds of muriate of potash (50 percent potash), 200 pounds of kainit (12.5 percent potash) or 125 pounds manure salt (20 percent potash) may be used with equally good results.

“Black-jack” lands are so deficient in potash that clover, soybeans, cotton and corn often rust or “french” when grown on them. At least 300 pounds of kainit should be used on such soils.

Where red clover is sown on wheat in the spring, a good system of fertilization for both crops is as follows:

2,000 pounds (or more) ground limestone per acre before sowing wheat.

300-400 pounds 16 percent acid phosphate per acre when wheat is sown.

100 to 200 pounds acid phosphate and 40 to 50 pounds muriate of potash when clover is sown in spring. If the land is poor add 50 to 100 pounds nitrate of soda to this application, or top-dress the wheat with stable manure.

It is important to apply some fertilizer when the clover seed are sown, as this will be a great help toward getting a stand.

If clover is to be sown at the same time with wheat, fertilize as follows:

300 to 400 pounds 16 percent acid phosphate and 40 to 50 pounds of muriate of potash at sowing. Add 25 to 50 pounds nitrate of soda to this to start the clover if the land is poor, and 50 to 75 pounds nitrate of soda the following spring if needed. The next spring (the clover's second year) top dress the clover with 100 to 200 pounds 16 percent acid phosphate per acre.

Where clover is sown alone use 200 pounds 16 percent acid phosphate and 50 pounds muriate of potash per acre when sowing; then



apply 100-200 pounds 16 percent acid phosphate early in the second spring.

On "Black-jack" lands the amount of potash should be increased 50 percent and the acid phosphate cut in half.

### SEED FOR PLANTING

While it is good policy to plant only the best seed of all crops, this is especially true of red clover seed. Dodder, plantain, and many other obnoxious weeds have seed nearly the same size as red clover. These seed are often found in clover seed offered for sale; sometimes as many as 100,000 of them to the pound. When these weeds are once sown they will remain on the land as long as the clover does. All clover seed should be tested for purity and germination, and if found unsatisfactory, should be rejected. Reliable seed houses will send out samples of seed they have for sale, and the N. C. Department of Agriculture will test these free. Buy seed only from reliable firms, and buy the best they have to offer. They will cost more per bushel than low grades, but less for each pound of actual viable red clover seed.

The second crop of clover makes most of the seed, and North Carolina growers sometimes secure their seed by cutting and threshing this crop. Home grown seed are likely to contain more weed seeds than commercial seed. This is because they come from fields where there are too many weeds, and because they are seldom properly cleaned. The ordinary clover huller does not separate the weed seeds from the clover seeds. After threshing, the seed should be recleaned with a special seed cleaner. **Do not attempt to save clover seed from fields that are not free of weeds.** Remember, also, when the first crop is cut for hay and the second for seed, that the soil has been depleted instead of improved.

### SOWING THE SEED

In sowing the clover in the fall the usual dry weather that prevails for several weeks must be reckoned with, as well as the winter freezes. After the land is plowed the land should then be harrowed well several times before sowing, so as to make a fine seed bed and one that will conserve moisture. The seed should be sown early enough to make a good root system before cold weather. Otherwise, freezing of the soil may lift the young plants out of the ground, which, of course would kill them. On the other hand, hot weather will ruin the young plants if sown too early. September 15 to October 15 is a desirable time for fall sowing of red clover alone. Clover sown in the spring must be put in late enough to avoid severe freezing, which will kill the plants when very young; and early enough to let them take hold well before hot, dry weather of summer. On an average, between March 10 and April

10 will be safe. There is always plenty of moisture at this time of year.

Success in securing a stand of clover is greatly influenced by the way the seed are sown, as well as the time. Formerly it was recommended to sow when the ground was heaved up by a freeze, or simply to sow the seed and harrow or roll them in. Fifteen pounds of seed per acre was the standard rate. More recent experience, however, has taught that a grain drill with a clover seeding attachment will do better work. With it, the seed are more evenly spaced and covered better, so that each seed has a better chance to grow. **Many leading farmers claim that with the grain drill they need only half as many seed to get a stand as when sowing by hand. Instead of fifteen pounds, they sow seven or eight pounds per acre.** Clover seed are always high in price, so that at this rate the seeding attachment would soon pay for itself.

There are two types of seeders in use. One kind drops the seed just ahead of the drill discs, and the other delivers the seed into the grain spouts. When sowing clover the drill must be so adjusted as not to cover the seed too deep. This may be done by releasing the springs that bear upon the discs. A special clover drill is on the market, which is said to require even less seed than the seeding attachment. This might be a profitable investment for large growers.

Some farmers mix clover seed with fertilizer, and sow them together, using the grain drill. They claim that this practice gives good results.

### SOME METHODS OF SOWING

On livestock and dairy farms, red clover is sometimes sown alone in the fall on specially prepared ground. The clover gets an early start in this way, and will make a good cutting of hay the first year, in addition to the two crops during the second year. It will also afford some pasturage during the spring and fall. It is also sown with wheat or other grain in the fall. Some growers report better success in sowing clover alone than in this way. Wheat should not be sown before October 10 or 15 on account of the Hessian fly, and this date is rather late for clover. Still another way is to sow the clover in the spring on land where small grain, usually wheat, is already growing. Under these conditions the clover will make little growth the first year, unless the land is fertile. A cutting of weeds containing some clover is secured late in the summer. This has value as a low grade roughage, but the main purpose in mowing the weeds is to prevent them going to seed, to allow the clover more room to grow, and to get them out of the way of the next year's hay crop. However, we have the advantage of not having to prepare the land for the clover, but simply to sow it. Also, we get a crop of grain the first year to make



up for small returns from the clover. Many farmers grow wheat and clover continuously on the same land, depending on the clover to re-seed itself. The great disadvantage of this system is that the field is not planted in a cultivated crop. Weeds become more abundant every year, and finally kill out the clover.

In the Coastal Plain Section, red clover may be grown on the heavier soils by sowing between corn or cotton rows in the fall. It should be lightly harrowed with a cultivator, just as crimson clover is treated. It will give abundant yields of hay for two years.

### CURING THE HAY

For the best hay, clover should be cut when just past full bloom. The hay should be allowed to wilt, then should be raked into winrows. The curing should be done in the winrow or in the cock. By this method most of the leaves will remain on the plants, increasing the nutritive value, and the color and aroma of the hay will be better. When clover hay is cured on the ground where it falls, most of the leaves become brittle, and will fall off in handling.

### ROTATIONS WITH RED CLOVER

A few good rotations using red clover for hay and soil improvement are as follows:

No. 1.

1st year: Corn, with cowpeas or soybeans in the same row or in alternate rows with the corn. Wheat, oats, or rye sown in fall.

2nd year: Wheat, oats, or rye, with red clover.

3rd year: Red clover, first crop for hay, second for soil improvement.

No. 2.

1st year: Corn, followed by rye or crimson clover.

2nd year: Rye or crimson clover turned under.

Soybeans or cowpeas, used for hay or seed.

Wheat, oats or rye sown in fall.

3rd year: Wheat, oats, or rye, with red clover.

4th year: Red clover.

Note:—Soybeans may be planted in the corn if desired.

No. 3.

1st year: Corn, with cowpeas or soybeans.

2nd year: Cotton, wheat, oats, or rye sown in fall.

3rd year: Wheat, oats, or rye, with red clover.

4th year: Red clover.

## No. 4.

1st year:—Corn with soybeans or cowpeas.

2nd year: Cotton, followed by rye as a cover crop.

3rd year: Soybeans or cowpeas.

Wheat, oats or rye in fall.

4th year: Wheat, oats, or rye with red clover.

5th year: Red clover.

## No. 5.

1st year: Corn, followed by red clover in fall.

2nd year: Red clover.

3rd year: Red clover, second crop turned under for wheat.

4th year: Wheat, followed by soybeans, or cowpeas for soil improvement.

## No. 6.

(For heavy lands in the Coastal Plains—well drained)

1st year: Corn, with soybeans.

Oats sown in fall.

2nd year: Oats, followed by soybeans or cowpeas.

3rd year: Cotton, red clover sown in cotton middles in fall.

4th year: Red Clover.

5th year: Red Clover.



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